

METHOD FOR THE DIRECT ESTERIFICATION OF SORBITOL WITH
FATTY ACIDS

BACKGROUND OF THE INVENTION

I. Field of the Invention

The present invention relates to a process for the production of sorbitol fatty acid esters through direct esterification. More specifically, the direct esterification process of the present invention is directed to the production of mixtures of sorbitol fatty acid esters with a degree of hydroxyl substitution ranging from about 3 to about 5.5 fatty acid ester groups, which are useful as low calorie fat substitutes.

II. Description of the Prior Art

Continued concern with health problems such as obesity and arteriosclerosis, which are associated with a diet high in fat content, has led to new formulations of normally high-caloric fat-containing foods. These formulations are often referred to as "diet," "lite" and "low calorie" and are made by replacing the normally present fat with fat substitutes, thereby reducing the fat content. It is generally known that certain sorbitol fatty acid esters and polyesters can be used as such fat substitutes.

Sorbitol fatty acid esters may be prepared by a variety of methods. These methods include transesterification of sorbitol with methyl, ethyl or glycerol fatty acid esters (U.S. Pat. Nos. 5,458,910 and 5,612,080), enzyme catalyzed direct esterification of sorbitol with fatty acids (U.S. Pat. No. 4,614,718), and acylation of sorbitol with a fatty acid chloride or anhydride.

Depending on the method by which the sorbitol fatty acid ester is made, it contains varying degrees of hydroxyl substitution and varying proportions of sorbitol anhydride esters. For example, when esterification is carried out by acylation of sorbitol with a fatty acid chloride, the product generally contains very little or no sorbitol anhydride esters. In contrast, transesterification of sorbitol with fatty acid methyl esters under basic conditions can result in a product in which about 15-20% of the sorbitol fatty acid esters are esters of sorbitol anhydrides. Additionally, depending on the method of production, the sorbitol fatty acid ester